IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: **John N. Glover**	Examiner: **David L. Sorkin**
Serial No.: **09/320,950**	Art Unit: **1723**
Filed: **May 27, 1999**	Attorney Docket No. **105218.04**
For: **FILTERING MEDIUM AND METHOD FOR CONTACTING SOLIDS CONTAINING FEEDS FOR CHEMICAL REACTORS**	

SUPPLEMENTAL DECLARATION OF JOHN N. GLOVER

I, John N. Glover, declare that I am over the age of twenty-one (21) years of age and am fully competent to make this declaration. I have personal knowledge of the facts set forth in this declaration and they are true and correct. I declare:

1. I am the President of Crystaphase International, Inc. and its related corporate entities (hereinafter "Crystaphase"), and maintain an office at Crystaphase at 16945 Northchase Drive, Suite 1610, Houston, TX, 77060-6029. I have been employed by Crystaphase since 1989 to the present as the President. I am the named inventor in the above-identified patent application and am familiar with the disclosure in the above-identified patent application.

2. I have worked in the petroleum refining and petrochemical industries for at least twenty-five years. I am familiar with ceramic filter units, catalysts, and recycling of these units.

3. I am a named inventor of the subject application and thus would be considered of above-ordinary skill in the art of ceramic filter units and associated methods. In my position of President, I have supervised numerous individuals and therefore am knowledgeable about the level of understanding of one with ordinary skill in the art in the field of ceramic filter units.

4. My educational experience includes undergraduate studies in Biology and Chemistry. I have performed numerous experiments on the subject matter of the above referenced patent application. I am extremely familiar with terms in the industry and the understanding associated with those terms throughout the industry

5. As discussed in my previous Declaration dated November 5, 2003, I participated in an experiment in which comparative performance data was obtained for ceramic filter units comparing ceramic units in accordance with embodiments of the presently claimed methods having combinations of elliptical and circular openings, along with flutes, to ceramic units in accordance with prior art units having combinations of circular openings and flutes (See Table I). Five prior art ceramic units (Products A, B, C, D, and E) were compared to three ceramic units made in accordance with the presently claimed embodiments (Products F, G, and H, as shown in FIG. 4 of the present application).

6. As discussed in my previous Declaration dated November 5, 2003, the maximum flow rate in a cell, among other parameters, was measured for all of the tested ceramic units. The maximum flow in a cell was determined by measuring the flow rates of each active cell and determining the highest flow rate of those cells. In this experiment, the lower the maximum flow rate, the better. The best performing ceramic unit tested was Product F with only a 4.46% maximum flow rate in any one cell (See Table I). The best performing prior art ceramic unit was Product C with an 8.45% maximum flow rate in any one cell (See Table I). The best embodiment of the presently claimed methods, Product F, performed approximately 47% better than the best performing prior art ceramic unit tested, Product C (See Table I).

7. In this Supplemental Declaration, new rows 10 and 11 have been added to the initial test results of Table I to demonstrate additional unexpected and surprisingly advantageous properties discovered by Applicant. In particular, rows 10 and 11 demonstrate that unit F having elliptical openings in an embodiment of the presently claimed methods has improved lateral displacement and volumetric distribution properties when compared to the prior art units A-E.

8. Table II of this Supplemental Declaration includes a second set of test results, in

which comparative performance data was obtained for ceramic filter units comparing ceramic units having trisoid shaped openings to ceramic units in accordance with prior art units having combinations of (i) triangular and (ii) circular, oval and triangular openings. The test results show that trisoid shaped openings (see Table II, column D) displayed unexpected and surprisingly advantageous fluid distribution properties, in particular, maximum flow rate and volumetric distribution, when compared to the prior art units of Table II, columns A-C, and of Table I, column C.

9. In Table II, the best performing ceramic unit tested was Applicant's Product D with only a 6.40% maximum flow rate in any one cell. In contrast, the best performing prior art ceramic unit in Table II was Product B with an 11.19% maximum flow rate in any one cell. The best performing prior art ceramic unit in Table I was Product C with an 8.45% maximum flow rate in any one cell. In other words, Applicant's Product D performed better than the best performing prior art ceramic units tested, Products C and B, from Tables I and II, respectively. Although Product D does not include a central opening, I believe that these test results are generally indicative of the fact that units having trisoid shaped openings such as Product D perform unexpectedly and surprisingly better than prior art units having differently shaped openings such as those tested herein.

10. Crystaphase has enjoyed much commercial success from the sale of these ceramic units. Crystaphase began selling the ceramic units made in accordance with embodiments of the presently claimed methods in 1998. Since then, Crystaphase has sold more than eight million dollars worth of units made in accordance with embodiments of the presently claimed methods, which approximates 40,000 cubic feet of product being sold, which correlates to about 30% - 35% of the total market in recent years. With so many units sold, the ceramic units should be deemed to have met an unfilled need in the industries in which these ceramic units have been sold.

11. I believe there is no motivation for one of ordinary skill in the field of ceramic filter units to utilize ceramic disc units containing a central circular opening and at least three elliptical openings, or trisoid shaped openings, in accordance with embodiments of the presently claimed methods, at least without resorting to hindsight after viewing the present invention.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the publication or any patent issued thereon.

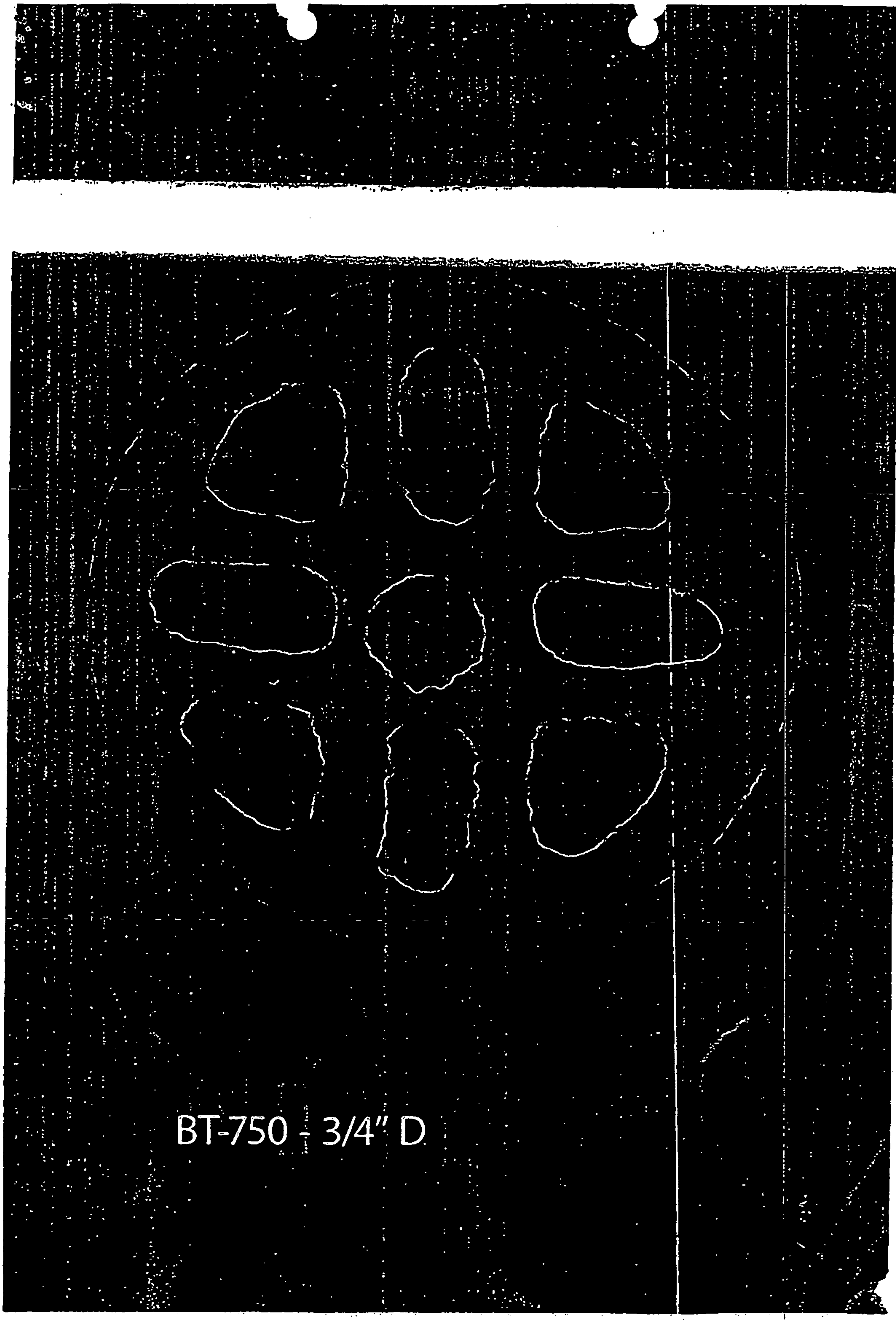
Date: 2/25/2008 ____________________

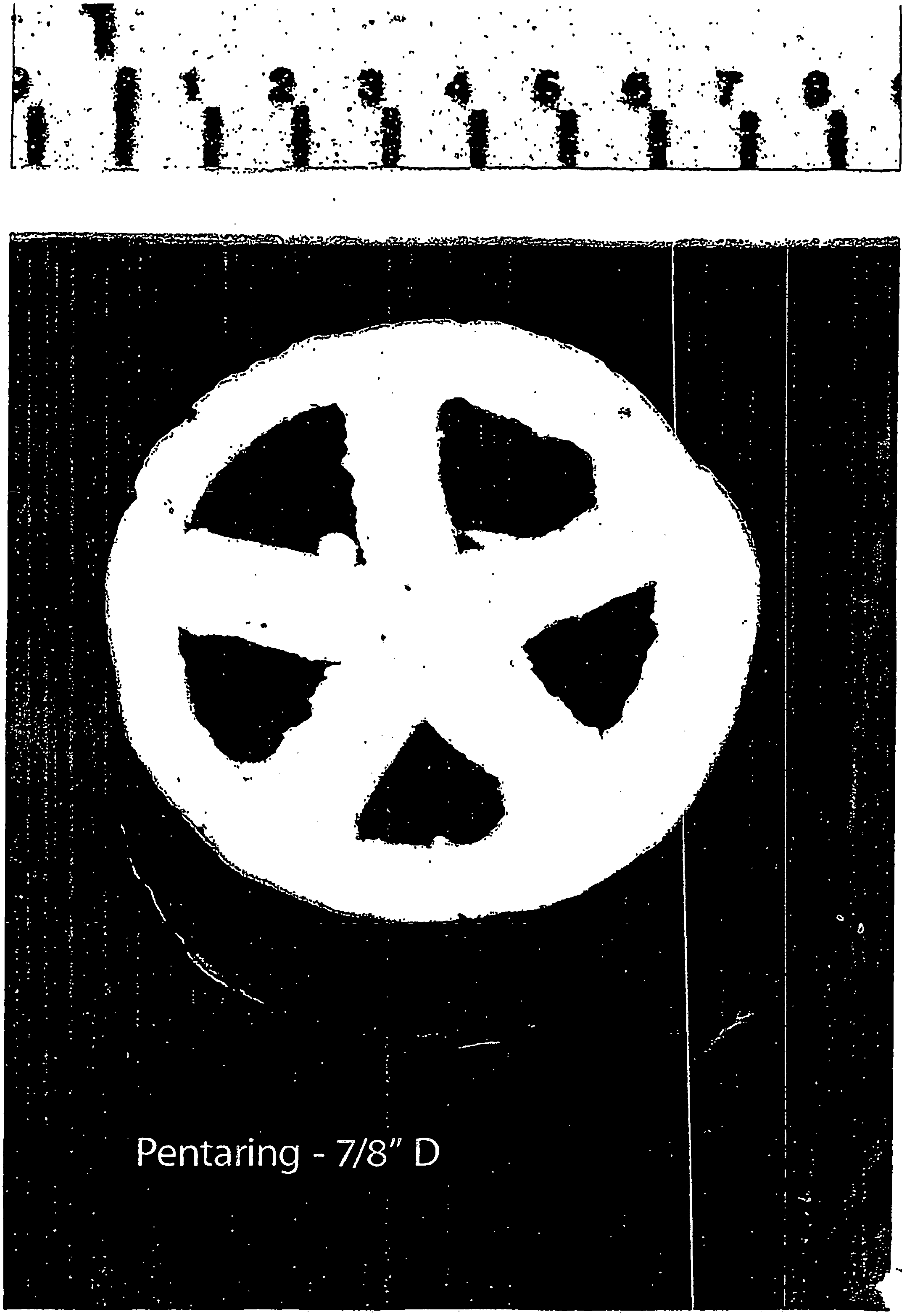
John N. Glover

TABLE I - SUMMARY OF COLD FLOW EXPERIMENT RESULTS

Shape	PRIOR ART					PRESENT INVENTION		
	Spheres		Cylindrical Openings			Elliptical Openings		
Product	A (3/4" Ceramic balls)	B (3/4" Ceramic balls)	C (5/8" TK-10)	D (7/8" TK-10)	E (5/8" Dypor-607)	F (5/8" BG-1000)	G (7/8" BG-1000)	H (7/8" BG-1002)
Top layer – Depth	6"	12"	6"	6"	6"	6"	6"	6"
Shape	Sphere	Sphere	Disc with 7 cylindrical openings	Disc with 7 cylindrical openings	Disc with one cylindrical opening and six flutes	Disc with four elliptical and one central circular openings	Disc with four elliptical and one central cylindrical openings	Elongated Disc with four elliptical and one central cylindrical openings
Void space	n/a	n/a	55%	55%	60%	60%	60%	63%
Bottom layer – Depth	6"		6"	6"	6"	6"	6"	6"
Size and Shape	¾" Sphere		¾" Sphere	¾" Sphere	¾" Sphere	¾" Sphere	¾" Sphere	¾" Sphere
Void space	~39 %		~39 %	~39 %	~39 %	~39 %	~39 %	~39 %
1. Total number of active cells	36	46	58	46	59	86	69	84
2. % of active cells	14.23%	18.18%	22.92%	18.18%	23.32%	33.99%	27.27%	33.20%
3. Area of Active Cells	49	100	143	72	120	180	121	153
4. Number of active cells greater than 5 cells distance from center	0	0	2	0	1	4	2	10
5. Number of active cells greater than 6 cells distance from center	0	0	0	0	0	0	0	3
6. Average Flow Rate per Active Cell	2.78%	2.17%	1.72%	2.17%	1.69%	1.16%	1.45%	1.19%
7. Maximum Flow Rate in a Cell	10.42%	7.03%	8.45%	10.39%	9.07%	4.46%	7.17%	9.74%
8. Percentage of active cells greater than 3% of total flow	27.78%	23.91%	17.24%	26.09%	23.73%	10.47%	8.70%	8.33%
9. Percentage of active cells greater than 5% of total flow	25.00%	8.70%	5.17%	6.52%	5.08%	0.00%	7.25%	3.57%
10. Lateral Displacement (0 – 100)	38.88	55.55	66.89	NA	NA	72.21	NA	NA
11. Volumetric Distribution (0 – 100)	71.04	69.04	71.83	NA	NA	79.00	NA	NA

TABLE 2 - SUMMARY OF ADDITIONAL COLD FLOW EXPERIMENT RESULTS				
	PRIOR ART			PRESENT INVENTION
Shape	Triangle Openings	Triangle Openings	Circular, Oval and Triangle Openings	Trisoid Openings
Product	A (1 3/4" AFS)	B (7/8" Pentaring)	C (3/4" BT-750)	D (7/8" BG-4000)
Top layer – Depth				
Shape	Disc with 265 triangle openings	Disc with five triangle openings	Disc with 1 central circular opening, four oval openings and four triangle openings	Disc with five trisoid openings
Void space	~75%	~60%	~55%	~60%
Bottom layer – Depth	0"	0"	0"	0"
Size and Shape				
Void space				
1. Total number of active cells	40	67	44	52
2. % of active cells	15.81%	26.48%	17.39%	20.55%
3. Area of Active Cells	132	143	100	144
4. Number of active cells greater than 5 cells distance from center	8	2	5	4
5. Number of active cells greater than 6 cells distance from center	3	0	0	1
6. Average Flow Rate per Active Cell	1.97%	1.41%	2.27%	1.92%
7. Maximum Flow Rate in a Cell	15.00%	11.19%	14.17%	6.40%
8. Percentage of active cells greater than 3% of total flow	2.77%	2.77%	3.56%	3.95%
9. Percentage of active cells greater than 5% of total flow	1.58%	1.58%	1.19%	0.79%
10. Lateral Displacement (0 – 100)	63.94	66.89	55.55	66.66
11. Volumetric Distribution (0 – 100)	50.32	63.87	75.00	85.56


BT-750 - 3/4" D



Pentaring - 7/8" D

BG-4000 - 7/8" D